

The synonymies of *Dolichopus lepidus lepidus* Staeger, 1842 — demasculinisations, lectotype designations and a *nomen oblitum* (Diptera, Dolichopodidae)

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Abstract

Type material of all synonyms of *Dolichopus lepidus lepidus* Staeger, 1842 was examined, except for *D. dissimilipes* Zetterstedt, 1843 where no type material was available. Lectotype specimens are designated for *D. lapponicus* Becker, 1917 and *D. uliginosulus* Dyte, 1980. The previously proposed, but not directly verified synonymy of *D. lapponicus* with *D. lepidus* is here confirmed. Two junior synonyms—*D. lapponicus* and *D. cruralis*—were provoked by nematode infections that lead to demasculinisation of the males, which mislead former authors in their descriptions. Demasculinised specimens of the junior synonyms are depicted. To stabilize nomenclature, we propose *Dolichopus lepidus* as ***nomen protectum***, and the senior synonym but forgotten name *D. tibialis* Zetterstedt, 1838 as ***nomen oblitum***. We provide insights into the historical background of the Zetterstedt name, based on remarks by Loew on Zetterstedt's descriptions. Additionally, nematodes were found for the first time in specimens of *Dolichopus lepidus lepidus* Staeger, 1842 from the Alps, and in specimens of *Dolichopus urbanus* Meigen, 1824, and *D. subpennatus* d'Assis Fonseca, 1976 from lowlands (Belgium). Nematode-infected specimens of *Dolichopus* spp. were previously reported exclusively from Scandinavia, and a boreomontane distribution was then suggested.

Key words: taxonomy, lectotype, synonymy, nomen protectum, parasite, Nematoda

Introduction

Dolichopus Latreille, 1796 is one of the most species-rich genera within Dolichopodidae with 580 species described worldwide (Yang *et al.* 2006; but see also Sinclair *et al.* 2008). The Old World *Dolichopus lepidus* Staeger, 1842 presently contains two subspecies. The nominal subspecies *D. lepidus lepidus* Staeger, 1842 is widely distributed in the Palaearctic and Oriental regions (Yang *et al.* 2006), whereas *D. lepidus microstigma* Stackelberg, 1930 was described, and presently solely known from Russia.

Recently, Kahanpää (2008) synonymized several *Dolichopus*-species, among them *D. cruralis* Wahlberg, 1850 with *D. lepidus*. These synonyms were originally thought to be separate species but were misidentifications, the authors being misled by specimens that possessed a nematode infection, which modified mostly the male's primary (hypopygium) and secondary sexual characters (on legs, wings, heads). These modifications, referred to as "demasculinisation" or "intersexualism", were hitherto primarily reported from nematoceros Diptera such as Culicidae, Ceratopogonidae and Chironomidae. Especially Chironomidae show similar alterations of the males in tarsal, antennal and wing characters (Wülker 1965).

The reported finding of demasculinised dolichopodids by Kahanpää (2008) led us to examine further specimens related to *Dolichopus lepidus lepidus* to determine if any had also been infected by nematodes. The consequences of these examinations for taxonomy are reported herein.

Within the examination of sample specimens of various Dolichopodidae as the basis of an ongoing phylogenetic study (Bernasconi *et al.* 2007a, 2007b; Germann *et al.* 2010; Pollet *et al.* 2010), further aberrant male specimens from the Swiss Alps, and from lowlands (Belgium) were encountered. Again, nematode infections caused these modifications, which are reported and discussed below.

Material and methods

Specimens were examined from the following museum collections: MCSN—Museo Cantonale di Storia Naturale, Lugano, Switzerland; MZLU—Museum of Zoology, Lund, Sweden; NHRS—Naturhistoriska Riksmuseet Stockholm, Sweden; ZMHB—Zoologisches Museum der Humboldt Universität Berlin, Germany; ZMUC—Zoological Museum University Copenhagen, Denmark.

Label data for primary types are cited in full, where labels are listed from the top downward, with data from each label enclosed in quotation marks. Labels are cited with original spelling, punctuation and date and lines are delimited by a slash mark (/). Additional information is included in square brackets. The investigated nematode-infected material is conserved in 90% alcohol, and is deposited in the MCSN.

Pictures were taken with a 5-megapixel digital camera (Leica DFC 420). Series of images were captured through a binocular (Leica MZ16), and processed with an Auto-Montage software (Imagic Image Access, Version 8) for best results in depth of sharpness.

Taxonomy

Dolichopus lepidus Staeger, 1842 *nomen protectum*

Description: Staeger (1842: 36).

Type specimens. *Dolichopus lepidus* was described based on a single male specimen.

Material examined. **HOLOTYPE** male labelled: “♂ Lerso [Lersoen]/ St. [Staeger]”; “Coll. Staeger”; “Lepidus/ Stag.” (ZMUC).

Type locality. “Leersoen i Slutningen” [Lersoen nearby Copenhagen (Denmark)] (Staeger 1842).

= *Dolichopus tibialis* Zetterstedt, 1838 *nomen oblitum*

Description. Zetterstedt (1838: 710).

Type specimens. Mentioned in Grichanov (2006b: 192), wherein the lectotype (male) and two paralectotypes (females) were designated.

Synonymy. Shortly after his original description in 1838, Zetterstedt (1843) listed *D. lepidus* as a synonym of *D. tibialis*. Later, Loew (1857) proposed the synonymy of *D. tibialis* with *D. geniculatus* Stannius, 1831, and highlighted the priority of *D. lepidus*, because the type series of *D. tibialis* was obviously composed of several species (mixed type series). In any case, based on the designation of the lectotype by Grichanov (2006b), the synonymy with *D. lepidus* is fixed.

Material examined. **LECTOTYPE** male labelled: “*D. tibialis*/ ♂. Stensele [Sweden]”; “Lectotype ♂/ Des. I. Grichanov.2004”; “*Dolichopus* ♂/ *lepidus* Staeger/ Det. I. Grichanov.2004”; “ZML.2009/ 075” (Fig. 1A). 1 female (paralectotype): “*D. tibialis*/ ♀. Tresunda [Sweden]”; “*Dolichopus lepidus* Staeger ♀ Det. I. Grichanov 2004”; “ZML.2009/ 076” (Fig. 1B). 1 female (paralectotype) [no original label except a small slip of blackish paper, also present on the pins of the other two specimens. Specimens collected by Zetterstedt during his excursions to Northern Sweden in 1832 are tagged with these slips of blackish paper (R.

Danielsson, pers. comm.)); “*Dolichopus* ♀/ *lepidus* Staeger/ Det. I. Grichanov.2004”; “ZML.2009/ 077” (all in MZLU).

Type locality. “Hab. in Lapponiae paludosis passim; scilicet ad Stensele et Tresunda...” [Västerbotten County (Sweden)] (Zetterstedt 1838).

= *Dolichopus geniculatus* Zetterstedt, 1843: 525 [misidentification] not Stannius, 1831 (Loew 1857: 12).

Remarks. The synonymy with *Dolichopus geniculatus* Stannius, 1831 was proposed by Loew (op. cit.). However, Wahlberg (1850: 220) had already noticed that Zetterstedt’s *geniculatus* was not conspecific with *geniculatus* Stannius, 1831.

= *Dolichopus dissimilipes* Zetterstedt, 1843

Description. Zetterstedt (1843: 527).

Synonymy. Ringdahl (1949: 57).

Remarks. Neither in the Zetterstedt collection in MZLU (R. Danielsson, pers. comm.), nor in the Fallén collection in NHRS (B. Viklund, pers. comm.), from where the material for Zetterstedt’s description originated, could type specimens of this species be traced. Without being able to confirm the status of this name through examination of type material, we here agree with Ringdahl (1949) who examined the type specimen “...wovon ich mich bei einer Untersuchung des Typenspecimens in Zetterstedts Sammlung überzeugt habe.” [...of what [the synonymy with *D. lepidus*] I have assured myself by the examination of the type specimen in Zetterstedt’s collection.]

Type locality. “Hab. in Scania” [Skåne County (Sweden)] (Zetterstedt 1843).

= *D. cruralis* Wahlberg, 1850

Description. Wahlberg (1850: 219).

Type specimens. The lectotype (male) and two paralectotypes (females) were designated by Grichanov (2006b: 184).

Synonymy. Junior synonym of *D. lepidus* proposed by Kahanpää (2008) based on nematode infected specimens.

Material examined. 1 male: Finland, Kuusamo, Sohramonlampi, (73302:36057), 7.VII.2006, leg. J. Kahanpää, jka06-01579 (MCSN).

Type locality. “Habitat ad Quickjock, Lapponiae Lulensis. In palude profundiore infra alpem Snjerak d. 9–20 Jul. 1845 utrumque sexum inveni.” [Kvikkjokk, Norrbotten County (Sweden)] (Wahlberg 1850).

= *Dolichopus picipes* Haliday, 1851: 157 [misidentification] not Meigen, 1824 (Verrall 1875: 31)

= *Dolichopus lapponicus* Becker, 1917

Description. Becker (1917: 141–142).

Type specimens. Becker (1917) solely indicated “♂ ♀” in his description, without specifying the number of specimens the name was based upon. We herein designate the lectotype (1 male) and 4 paralectotypes (2 males and 2 females) from Becker’s collection from the type locality (see below).

Synonymy. *Dolichopus lapponicus* was first synonymized with *D. cruralis* by Stackelberg (1930) and later Ringdahl (1949) listed *D. lapponicus* under several “*monströse Formen*” in his paper, where he was aware of the modifications that altered the appearance of male specimens. Kahanpää (2008) synonymized *D. cruralis* with *D. lepidus* based on nematode-infected specimens and proposed the new synonymy of *D. lapponicus* with *D. lepidus*. Based on the type material examined here, we confirm this synonymy.

Material examined. **LECTOTYPE** (here designated) male labelled: “Gellivara VII/ 59807.”; “Type”; “*Dolichopus/ lapponicus/* Type Beck. ♂”; “*Dol. cruralis* v./ 930 Wahlb./ Stackelberg det. ”; “Zool. Mus./

Berlin" (Fig. 1C). 2 males, 2 females (paralectotypes) "Gellivara VII/ 43495."; "Typus"; "Zool. Mus./ Berlin".

Type locality. "Aus Gellivara, Lappland" [Gällivare, Norrbotten County (Sweden)] (Becker 1917).

Remarks. Additional to the type locality, Becker mentioned: "...und aus Lautaret, Dauphiné [France]; meine Samml.". However, this specimen, also examined during this study, belongs to *Dolichopus consimilis* Wahlberg, 1850 and not to *D. lapponicus*, which has already been reported by previous authors (e.g., Parent 1938). *Dolichopus consimilis* has been synonymized very recently with *Dolichopus picipes* Meigen, 1824 by Kahanpää (2008), also based on nematode-infected specimens.

= *Dolichopus uliginosulus* Dyte, 1980

Description. Becker (1925: 165–166) (first description); Dyte (1980: 224) (replacement name).

Type specimens. The description was based on at least one male and one female specimen (see below); however, solely a male specimen was found in Becker's collection. We herein designate the lectotype (1 male).

Remarks. *Dolichopus uliginosulus* is the replacement name of *D. uliginosus* Becker, 1925 (Becker 1925: 165), which is a junior homonym of *D. uliginosus* Van Duzee, 1923 (Van Duzee 1923: 69).

Synonymy. Junior synonym of *D. lepidus* proposed by Negrobov & Maslova (2004).

Material examined. **LECTOTYPE** (here designated) male labelled: "*uliginosus*/ Beck."; "Seefeld [?]/ O. W. N./ 10.VII.22" [partly written in Sütterlin, an old German script (H. Ulrich, pers. comm.)]; "*Dolichopus*/ *lepidus* Staeg./ Negrobov det. "; "Typus"; 5th label: "Zool. Mus./ Berlin" (Fig. 1D). A separate vial contains the hypogygium of the specimen with the following indications: *Dolichopus uliginosus* Zool. Mus. Berlin. Although Becker (1925) mentioned at least a male and a female specimen in his description (expressed by symbols of both sexes in his paper), we found only the here reported male lectotype specimen.

Type locality. The type locality is interpreted as "Seefeld" in Germany (former Ostpreußen), where the study of O. Harnisch – Becker's description is integrated therein – about the ecology of the peat bog landscape was conducted.

Historical background and taxonomic remarks

Several synonyms of *Dolichopus lepidus* have been proposed by different authors in the past (Zetterstedt 1843; Loew 1857; Stackelberg 1930; Ringdahl 1949; details are reported above), and by Negrobov & Maslova (2004) as well as Kahanpää (2008) more recently. Ringdahl (1949) realized that several species of *Dolichopus* showed unusually derived characters in male specimens, he called them "*monströse Formen*" [monstrous forms]. It was Kahanpää (2008) who determined these forms as nematode infected specimens, among them also *Dolichopus cruralis* and *D. lapponicus*, two of the five subjective synonyms of *D. lepidus*, where male specimens show a so-called demasculinised appearance (Fig. 2). However, part of the investigated type material of these synonymous names lacked designation of respective lectotype specimens. In order to definitely fix the names to the type material and to stabilize nomenclature, we have designated lectotypes.

The consequent lack of use of the name *Dolichopus tibialis* is surprising and needs further explanation, which is given in the following. *Dolichopus tibialis* is in fact a senior synonym of *D. lepidus*, if article 23.9 of the ICZN (1999) is not considered. However, Loew (1857) seems to have had influenced his followers in a rather convincing manner. In his statement regarding the way Zetterstedt (1843) treated *D. lepidus* as a synonym of *D. tibialis*, he was very direct and openly accused Zetterstedt of fraud in a taxonomic manner with the following introductory sentence: "*Der allein berechtigte Name für ihn ist lepidus Staeg*" [the only authorised name for it [the species] is *lepidus* Staeg]. Loew (1857) apparently regarded *D. tibialis* as "*Stammar*" (main species), conspecific with *D. geniculatus* Stannius, 1831, whereas *D. lepidus* was one of the "*Variet*" cited by Zetterstedt (1843) as "*var. tibiis posticis nigricantibus*"; note that this phrase is not part

of the original description of *D. tibialis*, but rather a re-interpretation of Zetterstedt's concept. The other variety (var. b) included in the original description of *D. tibialis* (Zetterstedt 1938) was later described by Zetterstedt (1843) as *D. groenlandicus*.

What contradicts Loew's (1857) view is the statement of Wahlberg (1850). He mentioned that *D. geniculatus sensu* Zetterstedt (1843) is not *D. geniculatus* Stannius, 1831, but *D. tibialis* (and hence the assumption that *D. tibialis* and *D. lepidus* are indeed conspecific is supported): "*Obs. 2. D. geniculatus Stann. nondum, quantum mihi innotuit, in Scandinavia captus, femina enim a Dom. Zetterstedt ad Wilhelmina, Lapponiae Umensis inventa, secundum individuum descriptum, pro comparatione mihi amicissime transmissum, ad D. tibiale cuius femina semper tibiae posticas obscure testaceas habet, ...*" [Second remark: *D. geniculatus* was, as far as known, not yet caught in Scandinavia, because the female found by Zetterstedt at Vilhelmina, province of Västerbotten [= Lapponia Umensis] seems to belong to *D. tibialis*, after the reference exemplar [from Zetterstedt] that has been kindly provided, where the females always show dark testaceous hind tibiae, ...].

However, all subsequent authors after Zetterstedt (1843), such as Kertész (1909), Lundbeck (1912), and Becker (1917) listed *D. tibialis* as a junior synonym of *D. lepidus*, whereas only Kertész (1909) followed Loew's (1857) view, and mentioned the mixed type series of *D. tibialis* by indicating "p. p." (pro parte) after the species name.



FIGURE 1. Labels of investigated type specimens of synonyms of *Dolichopus l. lepidus*: (A) *D. tibialis* lectotype, Stensele, Sweden; (B) *D. tibialis* paralectotype, Tresunda, Sweden; (C) *D. lapponicus* lectotype, Gellivara, Sweden; (D) *D. uliginosulus*, lectotype, Seefeld, Germany [?].

Reversal of precedence

Grichanov (2006b) designated the lectotype and paralectotypes of *D. tibialis* from the type series of the Zetterstedt collection but retained *lepidus* as the valid name for the species. Based on our search of the literature, *Dolichopus tibialis* has not been used as valid species since 1899. It was omitted in the catalogue by Negrobov (1991), and later only re-mentioned by Grichanov (2006a), Yang *et al.* (2006) and Grichanov (2006b) each time as a synonym of *D. lepidus*, where the latter mentioned the possible case of a *nomen oblitum* followed by a question mark. Following the requirements of Article 23.9 (ICZN, 1999) we include a

list below of 25 publications, published by more than 10 authors in the immediately preceding 50 years and encompassing a span of more than 10 years to support the conservation of *Dolichopus lepidus* Staeger, 1842 over *Dolichopus tibialis* Zetterstedt, 1838: d'Assis Fonseca (1978), Bährmann (1993), Bellstedt & Bährmann (1989), Bellstedt (1997), Bellstedt *et al.* (1999), Bernasconi *et al.* (2007a, 2007b), Brooks (2005), Chandler (1998), Dyte (1969), Grichanov (2006a, 2006b), MacGowan (1988), Maes & Pollet (1997), Meyer & Heydemann (1990), Negrobov (1991), Nelson (1971), Olejnicek (1974, 1997), Parvu (2000), Pollet (1991, 2000, 2001), Pollet *et al.* (1988), Pollini & Pollet (1998). Therefore, in accordance with Article 23.9, the younger name *D. lepidus* Staeger, 1842 is deemed valid as a *nomen protectum*, whereas the name *D. tibialis* Zetterstedt, 1838 is recognized as invalid and a *nomen oblitum*.

List of synonyms:

D. lepidus Staeger, 1842 ***nomen protectum***
 = *D. tibialis* Zetterstedt, 1838 ***nomen oblitum***
 = *D. geniculatus* sensu Zetterstedt, 1843, not Stannius, 1831
 = *D. dissimilipes* Zetterstedt, 1843
 = *D. cruralis* Wahlberg, 1850
 = *D. picipes* sensu Haliday, 1851, not Meigen, 1824
 = *D. lapponicus* Becker, 1917
 = *D. uliginosulus* Dyte, 1980

Further records of nematode infected specimens

Material examined: (3 specimens of *Dolichopus lepidus lepidus*) **Switzerland:** 1 ♂, Grisons, Mesocco, Bosch de San Remo, Swiss coordinates: N734.240/ E146.420, 1630 m a. s. l., 26.VI.1991, leg. F. Rampazzi (N. 283, A2); 2 ♂, Ticino, Olivone, Campra di Là, Swiss coordinates: N709.770/ E153.060, 1425 m a. s. l., 24.VI.1993, leg. F. Rampazzi (CAM, Tutta la zona studiata) (all specimens in MCSN).

Three *Dolichopus l. lepidus* male specimens originating from ecological surveys in the Swiss cantons of Ticino and Grisons could not be determined with certainty. They showed deviating morphological characters such as female-like heads (Fig. 2 H–I), a very short, stout hypopygium and the cerci were of a different shape than specimens assigned to *D. cruralis*, but these traits even varied within the three specimens available. Finally, even an intermediate position between *D. cruralis*, and *D. lepidus*, or a new species close to *D. lepidus* was speculated. Driven by the results of one of the authors (J. K.), the three specimens were dissected, and four nematodes were found within the abdomens (Fig. 3). In one specimen (Ticino) 2 nematodes (6 mm and 12 mm) were found. In the other specimens from Ticino 1 nematode (12 mm), and from Grisons another single nematode (7 mm) was found. In their lengths, the present nematodes correspond to those reported by Kahanpää (2008) with a size range from 7 to 15 mm. Although, no attempts to determine these nematodes were undertaken, we assume that these are the same and also belong to Mermithidae, already known as parasites of other Diptera (Poinar 1991).

Hitherto, nematode infected (demasculinised) specimens were solely confirmed from boreal region (Scandinavia, Russia) and no records from Lowlands of Central Europe were reported. A boreomontane distribution of the nematodes was stated (Kahanpää 2008). However, the known geographical range of the nematodes and the associated problem of demasculinisation are further broadened by the first record of the phenomenon from North America. Justin Runyon (pers. comm.) has reported that demasculinised *Dolichopus* males occur in the U.S.A. One paratype of the newly described species *Dolichopus frosti* Runyon, 2008 was dissected, and a single large nematode was extracted from the abdomen. The type material of *D. frosti* was collected together with *D. sincerus* Melander, 1900, which is the apparent host species. The key characters separating *D. frosti* from *D. sincerus* are characteristic for a demasculinised male with one exception: *D. frosti*

has long hairs on abdominal sternum 2 while *D. sincerus* has only very short hairs in this position (Runyon 2008). Nonetheless, it seems clear that *D. frosti* is an aberrant form of *D. sincerus*. Additionally, three demasculinised male specimens of *Dolichopus urbanus* Meigen, 1824, and one such specimen of *D. subpennatus* d'Assis Fonseca, 1976 were recently found. They represent the first nematode-infected specimens hitherto known from lowlands (Heure-en-Famenne in southern Belgium). Hence, the hypothesis of an exclusively boreomontane distribution of the nematode is rejected based on our results.

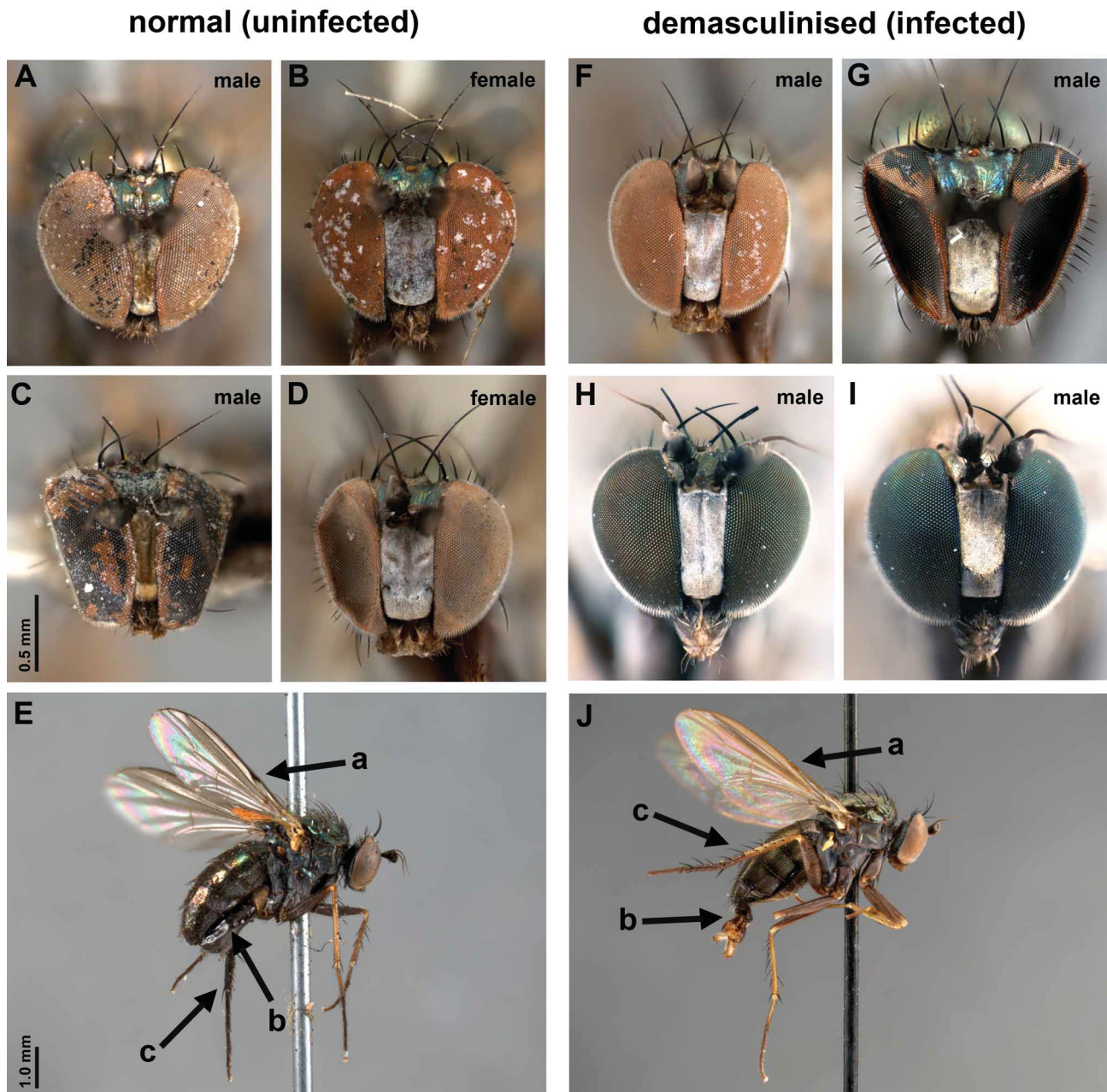


FIGURE 2. (A–E) Anterior view of heads of uninfected specimens of synonyms of *Dolichopus l. lepidus* showing considerable sexual dimorphism; (A) *D. tibialis* (lectotype male); (B) *D. tibialis* (paralectotype female); (C) *D. uliginosulus* (lectotype male); (D) *D. lapponicus* (paralectotype female); (E) *D. tibialis* (uninfected lectotype male), the characteristic male specific traits as a: costal stigma; b: long hypopygium; c: dark and thick hind tibiae are highlighted. (F–I) Ditto infected, male heads are similar to female ones; (F) *D. lapponicus* (lectotype male); (G) *D. "cruralis"* (Finland, Kuusamo male); (H) *D. "cruralis"* (Switzerland, Grisons, male); (I) *D. "cruralis"* (Switzerland, Ticino, male); (J) *D. lapponicus* (infected lectotype male); the nematode infection provokes an impressive reduction of the traits a, b, and c (= demasculinisation).



FIGURE. 3. Parasitic nematodes inside the abdomen of a male specimen of *Dolichopus* “*cruralis*” (*D. l. lepidus*) from Switzerland, Ticino, Olivone, Campra di Là, 1425 m a. s. l., 24.VI.1993 (MCSN).

Acknowledgements

We thank Roy Danielsson (MZLU), Joachim Ziegler (ZMHB), Bert Viklund (NHRS), and Thomas Pape (ZMUC) for the loan of specimens, and for their helpful remarks on particularities of the respective collections. We thank Darko Senekovic (Fachstelle Latein, University of Zurich) for his support with translating the Latin from ancient references, and Christian Kropf and Stefan Hertwig (Natural History Museum, Bern) for the use of technical infrastructure from the Museum. We are thankful to Igor Grichanov (Institute of Plant Protection, St. Petersburg), Hans Ulrich (Zoologisches Forschungsmuseum Alexander Koenig, Bonn), and Bernhard Merz (Muséum d'Histoire Naturelle de Genève) for their valuable comments on an earlier version of the manuscript. Thanks go to Justin Runyon (Pennsylvania State University) and Neil Evenhuis (Bishop Museum, Hawaii) for their constructive reviews, and to Bradley Sinclair (Canadian National Collection of Insects and Canadian Food Inspection Agency, Ottawa) for his editorial support. This project has been supported by a grant of the Swiss National Science Foundation to M.V. Bernasconi (Grant 3100A0-115981). This paper is situated within the frame of the PhD thesis of the first author (Christoph Germann) and is a contribution of the Zoological Museum (Institute of Evolutionary Biology and Environmental Studies) of the University of Zurich, Switzerland.

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